

## Technical Page

Proposal Type: Long-term  
 General Category: Terrestrial Aeronomy  
 Sub-Category: Radar  
 Observation Category: Ionosphere  
 Total Time Requested: 240 hrs for 2 years Hours  
 Minimum Useful Time: 5 hrs.

**Proposal Title:** Beat-wave Generation of VLF and ULF Radiations by Arecibo HF Heater  
**ABSTRACT:**

We propose a two-year experimental program for students' thesis research on the subject of "beat-wave generation of VLF and ULF radiations by Arecibo HF heater". In brief, we can use the newly constructed heater to produce two HF waves having a frequency difference in the VLF or ULF range. Based on our theoretical analysis [Lee et al., 2011(a)] and proof of concepts experiments carried out recently at Gakona, Alaska [Rooker et al., 2011; Cohen et al., 2010], we find that current distributions in the form of a loop dipole antenna can be produced by the beat wave to radiate at aforementioned frequency. The proposed research is inspired by our earlier Arecibo experiments in ionospheric HF heating, and recent ones in VLF wave injection using the Naval transmitter code-named NAU, operating in Aguadilla, Puerto Rico at the power and frequency of 100 kW and 40.75 kHz, respectively [Lee et al., 2011(b) and references therein].

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### Remote Observing Request

- Observer will travel to AO
- Remote Observing
- In Absentia (instructions to operator)

### Instrument Setup

430 CH radar

#### Atmospheric Observation Instruments:

Spectrophotometer Fabry-Perot Ionosonde Lidar

**Description of Observer Equipment:** All Sky Imaging System (ASIS), GeoMagnetic Observatory System (GMOS), VLF Receiving System.

**Special Equipment or setup:** None

**RFI Considerations**

**Frequency Ranges Planned**

None